VOLUME 1 - NO. 6 SEPTEMBER 1993

The Low Band Monitor

ZD9SXW Tristan Da Cunha

Roger, G3SXW advises that he will be active from ZD9 from September 30 to October 21. He will have a TS-930 and possibly an Alpha amplifier.

Look for him at 0700 UTC on 1.833 mz and 3.505 and 7.003 mz. during the normal hours.

This is a CW only operation that shows some real promise.

Z21HS Update from Zimbabwe

Ralph, Z21HS has advised that he will be assigned to Harare, Zimbabwe until July of 1994, which means those that did not work him on the low bands will get another chance this season.

Ralph travels to Beira, Mozambique once every quarter and hopes to do some low band work as C9NAD, if the usual details can be arranged.

Not new to low band operating (100 plus from Z21 on 40 and 80 meters), Ralph will be using his 160 meter inverted L on top band this season. His other calls are VK4VB and SMØLRK.

An Icom 735, and Drake L7 make up the station with a Yaesu FL-2100 for backup.

He is on HF Packet as Z21HS@Z21GH.MAS.ZWE.AF and has a FAX number for low band schedules of (263) 470-2003.

Ralph has had an excellent signal into North America on 80 meters in the past and represents a good opportunity for a 160 meter contact.

Argentina LU8DPM

Mario, LU8DPM sent in a nice note and has very impressive numbers (165, 154, and 108) from one of the most interesting and challenging DX locations in the world.

He is the only amateur in Argentina to hold DXCC on 160 meters and would be a viable candidate for an LU contact in the coming season.

His IC-735 and homebrew amplifier utilize inverted V's and slopers at this time. This is a good 160 meter beacon for gaging top band conditions this winter.

JA Group Effective From 3D2

The 160 meter signals of both 3D2OH and 3D2AW from Mama Island in the Fiji Island Group have been audible in the midwest U.S.A. in the latter part of September.

This group is comprised of JA2AO, JA2XW, JA2DHG, JA2IVY and JG2BRI. They did an excellent job providing many 160 meter enthusiasts with a new 160 meter country and were very active on other HF bands.

QSL to JR2KDN. We have requested information about their operation and hope to feature them in a future *Low Band Monitor.*

Season Outlook - Promising

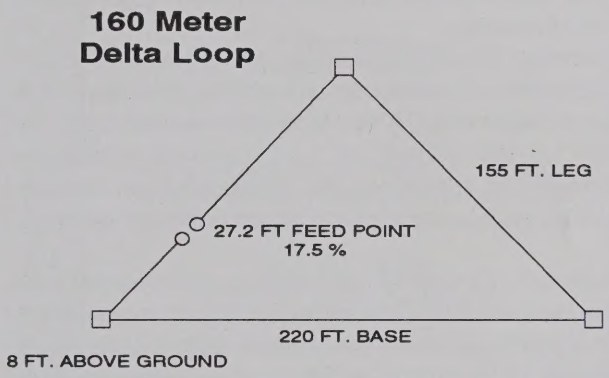
Low band propagation continues to improve this season, with some very good signs noticed during the month of September.

- Australia was audible on 75 meter phone for almost an hour past sunrise in Colorado.
- EA8PP was audible in Colorado on a 1.850 SSB net on the 27th of September at his sunrise.
- The West Coast contingent of N2KK, W6UA, and others, are working some very impressive European longpath prior to European sunrise almost every day.

I have decided to put the Beverage antennas up a month earlier than originally planned - it is indeed starting to get interesting.

Delta Loop Details

A 160 meter Delta Loop with a 17.5 percent feed is described on the following pages, that has improved my signal on the 160 meter band significantly. I ran out of space, so I will provide a simple diagram here.



This is a continuous 540 feet of #12 copper wire that is attached at the top of my 110 foot tower. The plane of the triangle will extend out from the base of the tower by about 12 feet.

FREQ	SWR
1.800	1.7 : 1
1.825	1.4 : 1
1.850	2.1 : 1
1.875	3.5 : 1

This antenna can be adapted for use on the 160 meter band without a tuner, by trying different base heights above ground. Please refer to the article for additional details. If you have the room for the 220 foot base, I recommend this antenna.

Direct Mail Campaign

We are currently sending *Low Band Monitor* flyers to active low band Dxers world wide.

Thus far the response from our direct mailing has been excellent. If you have a subscription candidate that you feel might be interested in our newsletter, send us his or her call and we will send them the particulars.

As this page is being written, there are less than 30 days left until the CQWW Phone Contest - will you be ready in time?

Lance Johnson - Editor

The Time Wave DSP-9

by KØCS

Editors Note: The low band enthusiast is always looking for ways to improve his or her ability to hear weak signal DX. Digital Signal Processing (DSP) is a technology that has been evolving in the last few years to the point where it might actually make a difference in your country total. This is the second DSP device reviewed by the Low Band Monitor.

I called *Timewave Technology* in St. Paul, Minnesota after hearing two different groups of 80 meter DXers rave about it's performance, while rag chewing and comparing notes on the 75 meter phone band.

Al Caplan, the sales manager, took my order over the phone and said that I would probably have a three week wait because demand for the *DSP-9* was very heavy. Al was formally with *Hy-Gain* and has been a regular on the Hamfest circuit for many years.

The unit arrived in about eleven days and the evaluation process was started, using a *Kenwood TS-930SAT* and the usual assortment of antennas.

Unpacking - The *DSP-9* enclosure will impress you. This is a very solid station accessory, with a front escutcheon design that is resistant to finger stains, a very classy, professional look. The unit weighs 2 pounds and is 6" x 6" x 1.75", so it will sit nicely on even the smallest of transceivers. The shipping box also contains a coaxial style power connector and the units 10 page operating manual.

Installation - You will first solder the power connector to an appropriate two conductor cable, noting that the power connector's center pin is positive. Connect your cable to an appropriate power supply capable of 12-16 VDC at 500 ma. Your connector plugs into the back of the DSP-9.

Now go to *Radio Shack* and purchase a 274-366 stereo headphone adapter so that your current 1/4" headphone plug can be adapted to the *DSP-9's* 3.5 mm mini jack.

You will also need to buy a two conductor cable of appropriate length that has an RCA plug on one end and an external speaker plug on the other end. My transceiver used a 1/4" accessory speaker plug, but this will vary from manufacturer to manufacturer.

The *DSP-9* operating manual also advises that you can connect an external speaker to the *DSP-9* with another RCA type cable. I would strongly suggest that you don't even bother with this option. You will probably get audio feed back on SSB when you transmit and as you know, if you can hear it on a speaker - it's not DX. If you have the cable(s) and stereo adapter on hand, figure about two minutes to install the *DSP-9*.

Operation - The *DSP-9* is designed with simplicity in mind. Once it is installed you will have to turn it on before you can hear audio from your transceiver. Remember, it is an active device and cannot be bypassed unless it is turned on.

The first step in the set-up of the *DSP-9* is the setting of your transceiver's audio level. Make sure that your transceiver audio is set below the point where the *DSP-9's* red "Overloaded" light comes on. Set your audio level just below the overload threshold and then bring up the audio of the received signal with the gain control of the *DSP-9*.

Now, you are confronted with six push buttons that control the *DSP-9's* functions.

Initially, you might choose to tune across the band with the Bypass switch selected, then when enhancement is desired, release the Bypass switch.

The *DSP-9* offers three filters for SSB (1.8, 2.4, and 3.1 khz.) and three for CW (100, 200, and 500 hz.) depending on your switch selection.

The unit also has a Tone Noise Reduction function that acts as an automatic notch type filter and can knock an offending carrier down as much a 50 db. This function works well.

The real surprise is the Random Noise Reduction function, that has the ability to knock various types of atmospheric noise down by 20 db. This is the what you paid your money for!

On the Air - My first experience with the *DSP-9* came on 75 meter phone. The first night I tried out the unit, there was a significant amount of atmospheric noise on the band. I selected the Random Noise Reduction function and was amazed at what happened.

The noise blasts were knocked down by the *DSP-9* to the point where the band was tolerable. After tuning around I was able to experiment with a few weak signals and found that occasionally the blasts would creep through and for a second, energize the unit's "Overloaded" LED, but otherwise the enhancement was very real.

My second session with the unit was during a severe local storm. The 75 meter phone band was useless. The *DSP-9* was game, but it could not handle a 60 db over S9 burst. I didn't expect it to perform under these conditions, as you need to be realistic and pick your opportunities with any device of this type.

Observations - For general operation and contesting I found the *DSP-9* capable of making the lower frequency bands a lot more tolerable. You can make a band appear to be more quiet and thus reduce the fatigue induced by the usual band noise. This statement is true, but this fact can only be accepted as a secondary benefit. A low band DXer will utilize a device of this kind for only one reason; to work DX that couldn't be worked otherwise.

Further experimentation continued on the lower frequency bands over a two week period with the following scenarios worthy of mention.

Ghana On 80 meter CW - The 9G1XA operation came on 3.505 mz. around 0130 UTC. The signal was 449 to 559, a good signal, but was masked with the usual atmospherics. The *DSP-9* pulled 9G1XA from "on the cusp" to "fully workable" status, utilizing the "Random Noise" function. I could probably have worked the 9G1 without the *DSP-9*, but I would have been "exposed". Yes - a big help!

Gambia On 80 meter CW - The 9J2BO station has been coming on 3.507 mz. around 0410 UTC. This signal has been 339 at best, and I'm being generous. A few days ago I was not able to enhance this signal with the "Random Noise" function. The signal would disappear completely when the "Random Noise" function was selected, due to the typical insertion loss. The SSB filters were also used as the CW filter is simply too narrow for a signal of this type. Sorry - no help!

Australia On 75 Meter SSB - I have been looking for VK9NS and any P29 on the 75 meter band for the last few weeks. All I have heard have been Australian beacon stations. Prior to sunrise the *DSP-9* makes the VK's very Q5 with the "Random Noise" function selected. I'm copying 100 percent instead of the typical 90 percent. A big help!

Fiji On 160 Meter CW - KV0Q spotted 3D2OH one morning on 1.824 mz well past our sunrise. I tuned to the frequency and found the 160 meter band to be relatively quiet, but there was the usual hiss on the 3D2OH signal. I pushed the "Random Noise" function and 3D2OH was an honest Q5 copy. Very weak, but Q5. The contact was made and ten seconds later 3D2OH was absolutely inaudible. A major help!

I carefully carved one notch into the case of the *DSP-9*. It put a new one into the log for me on 160 meters!

Some Important Tips - Let me list a few important bits of information that will enhance your use of the *DSP-9* and move you up the learning curve.

1. Power supply - If your power supply is variable, run the *DSP-9* at the lowest voltage possible and make sure that you have good DC voltage. You might compare your *DSP-9's* performance with your power supply and then with a battery to be sure.

2. Transceiver Audio Threshold - This will change from band to band, day to day, and signal to signal. This is a good test of your ability as an operator. Best performance occurs when you are at the threshold of "Overload", so check this often during your operating sessions and don't forget to control your receive audio with the *DSP-9's* gain control.

3. Transceiver RIT - Most people will find that they will need to adjust the tuned signal with the transceiver RIT after the *DSP-9* is switched in. I tend to tune low by a few tenths of a hz. and the sharp filtering of the *DSP-9* is not very forgiving.

4. CW Filters - The CW filters of the *DSP-9* are very effective, but don't overlook the three SSB filters when tuning a weak low band CW signal. Simply select the SSB mode.

5. Be Selective - This unit won't do miracles, but it can really help you when conditions are marginal. The enhancement seen during sunrise with the *DSP-9* is very real.

6. Your Transceiver - Don't forget to utilize your transceivers other enhancement features with the *DSP-9*. When combined, you will find that the *DSP-9* complements most of them.

Conclusion - I won't bore you with any more of my modest operating failures and achievements. Under the right circumstances, the *DSP-9* can put a new one into your log.

If the mixture of signal and atmospheric noise is within realistic limits, the device can truly assist you in copying those marginal reports that mean the difference between making the contact or having to try again.

This is a very simple device to operate and will allow you the opportunity to experience some true leading edge digital technology for a small investment.

At $169.00 the *DSP-9* represents excellent value to the low band DXer. Timewave also offers a more advanced unit called the *DSP-59* that also addresses the needs of RTTY, SSTV, AMTOR, PACTOR, Satellite, EME, AM and weak signal VHF enthusiasts at $299.00.

Timewave Technology can be contacted at 2401 Pilot Knob Road, St. Paul, Minnesota 55120 (612) 452-5939. Their FAX: is (612) 452-4571.

Additional Specifications: TIMEWAVE DSP-9

AUDIO INPUT
22 ohms

AUDIO OUTPUT
1.6 watts into 8 ohms at 13.8 VDC
3.2 watts into 4 ohms at 13.8VDC

SIGNAL PROCESSING
16 bit linear - Sigma Delta Conversion
16 bit 81 ns Analog AADSP-2105

VOICE FILTERS
- *Random Noise Reduction*
  Up to 20 db - Adaptive
  Maximum Delay 10 msec.
- *Tone Reduction*
  Up to 50 db - Adaptive
  Maximum Delay 10 msec.
- *Bandpass*
  60 db at 180 hz.
  FIR Linear Phase
  Maximum Delay 10 msec.

In the Voice Mode, *Random Noise, Tone Reduction* and *Bandpass* filters can be used simutaneously.

CW FILTERS
- *Random Noise Reduction*
  Up to 20 db - Adaptive
  Maximum Delay 10 msec.
- *Bandpass*
  60 db at 50 hz.
  FIR Linear Phase
  Maximum Delay 31 msec.

In the CW Mode, *Random Noise,* and *Bandpass* filters can be used simultaneously.

SPOT OF THE MONTH CLUB WINNERS FOR SEPTEMBER 1993

WIN AN EXTRA MONTH'S SUBSCRIPTION

W8UVZ
VK9MM - 1.825 - 1120 Z - 24 SEPT
N2KK
9A2DW - 3.505 - 0440 Z - 12 SEPT
W6NIZ
8R1AK - 7.163 - 0815 Z - 8 SEPT

SEND YOUR LOW BAND SPOTS TO:
Low Band Monitor
P.O. Box 1047
Elizabeth, CO 80107
(303) 646-4630

The 17.5 Percent Solution

by K0CS

Editor's Note - If you are planning on making a better effort on 160 meters this season you might give this antenna a try. After some initial concerns, it looks like this one might be a keeper.

Background - A few weeks ago I experienced what I call a "good old fashioned butt kicking" on the 160 meter band. I'm not talking about getting beaten out in a pileup, as that happens to me every time I get on the air. What happened to me is probably the most embarrassing thing that can happen to a DXer - a 160 meter DX station with a good signal couldn't hear me call on a clear frequency.

This was one of those once-in-a-lifetime moments. 9G1XA was calling at 1.827 mz., listening on 1.830 mz., and I was the only person in the world calling him. No K5UR, no W8AH, no K0RF, no N0XA, just me and the result of my call was, "9G1XA QRZ up". I didn't even merit a didi-dahdah-didit, I couldn't cut the mustard on a good path!

My current antenna is a full wave sloper at 100'. This is one of my typical "cop-out" summer antennas that lets me work a few multipliers in DX Contests and is adequate at best. Yes, I've worked a few Europeans, Howland Island and some Caribbean stations with this antenna, but with conditions and opportunity looking up it was obviously time for a change.

Talk To The Sages - I talked to Charlie, KY0A, an accomplished 160 meter DXer, about his transmit antenna set up and he told me that he was using a Delta Loop.

Delta Loops have been tried before at my station, and quite frankly they have never impressed me.

Charlie advised that his Delta Loop is enhanced by a dozen , 1/4 wave radials and has a feed point that is 17.5 percent up on one of the legs.

The addition of radials at the base of a Delta Loop is not new, as Ed Noll, W3FQJ, among others, wrote about the concept in, *Vertical Beam and Triangle Antennas*, in a Howard W. Sams & Company reference book in section 72.

The location of the feed point 17.5 percent up on one of the vertical legs intrigued me. Was Charlie putting me through some kind of strange Mile Hi DX Association practical joke initiation?

I called John, W0UN, a professional in the RF field and a speaker at a number of Dayton Hamvention™ Antenna Forums. John advised me that the "17.5 percent feed" has been discussed by a number of Delta Loop experts, and that the concept was first discovered by a very clever gentleman from Great Britain.

I then called Larry, WB0UXI, a truck driver from Missouri who has an uncanny ability to comprehend complex concepts and asked him about the concept. After ten minutes of computation, his response was "that guy from England knows his stuff".

Lets Do It - At this point it looked like this concept was worthy of consideration. Remember, we are talking about a full wavelength wire loop for 160 meters or 540 feet of wire.

The very act of measuring 540 feet of wire is not trivial. That's 180 yards, or a good 5 iron for me in Colorado. I used old reliable, insulated #12 copper for the project and was able to complete the measurements in under an hour.

The erection was also not trivial as you need to lay the basic triangle out on the ground first and orient your three insulators and feed point in an unsymmetrical manner.

I was curious about the need for a standoff at the top of the tower, but was advised by Charlie, KY0A, that it would not be necessary.

In my tower situation, I can have the apex at 110 feet. If you apply simple trigonometry to this scenario you will come up with a base leg of 220 feet and side legs of 155.6 feet.

In this case, the 220 feet of base leg will be lying on the ground, so it is obvious that you will be moving the plane of the antenna outward from the tower somewhat to get the base leg off the ground.

To apply the feed point at 17.5 percent up one of the legs you will come up with a distance of 27.22 feet (17.5% x 155.6' = 27.22').

After attaching the apex of the loop to the 110 foot point on the tower, it's time to attach your nylon ropes to your base insulators and tighten up the sides.

Here's how the tune-up procedure went at different loop orientations at 1.825 mz.

- *Base Lying on ground =10.5 : 1 SWR*
- *Base at 3 Feet = 2.5 : 1 SWR*
- *Base at 8 Feet = 1.3 : 1 SWR*

That's good enough for most applications, so I quickly drove two equally spaced fence posts into the ground and supported the base leg at the 8 foot level with two PVC pipes. The plane of the Delta Loop was no longer vertical as the base leg was now about 12 feet away from the tower as expected.

The height above ground for each loop will obviously vary at each installation, as you attempt to optimize the feed. The main point to remember here is that you can match this antenna quite easily without a balun, matching network or tuner!

I kept the full sloper on another tower for comparison and spent the next few days evaluating the antenna.

A 160 Meter Opening - The 160 meter band has been spotty, but initially I did notice some improvement in signal strength on various stateside 160 meter stations.

Then, on a Saturday morning KV0Q spots a 3D2 station on 1.824 mz. at 1352 UTC. I check the frequency with the full-sloper and hear nothing, I switch to the Delta Loop and I here a signal.

Now the acid test, I call the 3D2. After two calls, a VE7 beats me, but surprisingly, on the third call he responds, and a decent 160 meter contact is made.

Conclusion - At this point I can honestly say that this antenna, with some additional radials will be a part of my 160 meter system this season.

It offers low cost, ease of tuning and only requires one tower support. If you are looking for a new approach to 160 meters, this antenna is worthy of your consideration.

If anyone knows the name of the Englishman who promoted this 17.5 percent feed point concept, please let us know - he apparently knows his stuff.

The Battle Creek Special

with Charles Dewey - WØCD

Editor's note: Charles Dewey, WØCD the antenna designer, answered our request for information about the "Battle Creek Special" low band antenna. This antenna is sponsored by W8UVZ, K8GG, and WØCD, the "Battle Creek Top-Banders", and has probably put a number of new band countries in your log. The best low band Dxpedition signals in recent years have used this antenna.

Background - The "Battle Creek Top-Banders" now have the *Battle Creek Special* antenna available for loan (not for sale) to DXpeditions to rare and semi-rare locations by the low-band faithful.

The "Battle Creek Top Banders" are a non-commercial group of low band enthusiasts from Battle Creek, Michigan, who have donated their formidable expertise solely for the betterment of 40, 80 and 160 meter antenna performance during DXpeditions.

W8UVZ, K8GG and WØCD have put a significant amount of thought, field testing and money into the design of this antenna..

This is the antenna LA2GV and F2CW used on Bouvet on 160 and 80 meters in 1989/90.

It has also traveled with Mike, K9AJ to 8Q7AJ, where many Europeans and VE1ZZ worked the Maldives on 160 meters.

The first version of the antenna was donated to the Northern California DX Foundation and now resides with Chris Berger, ZS6EZ, who used it at ZSØZ, Penguin Island and at 7P8EN, Lesotho.

This antenna was loaned to G4FAM/3DA and received high marks from Swaziland.

A second version of this antenna was constructed for the AH1A, Howland Island Dxpedition, where it also performed extremely well.

Operation - This antenna, known to the developers as the MK-II.0, operates as a quarter wavelength vertical on 40 meters and as a quarter wavelength inverted L on 80 and 160 meters. This antenna is designed to complement a tri-band beam. The *Battle Creek Special's* performance is significantly better than commercially made portable antennas previously used on DXpeditions.

Mechanicals - The vertical portion is a trapped aluminum mast, about 48 feet or 15 meters high, top loaded for the 80 and 160 meter bands. It covers all of the 40 meter band, 80 meter CW and 40 khz. on the 160 meter band with SWR's under 2 to 1 in the basic configuration.

Two people can assemble and erect the antenna in less than two hours. It can be taken down and packed for shipment in about one hour.

It comes complete with a tilt-up base, guy lines, guy stakes, radials and top loading wires and is packaged in a reinforced shipping case. The total weight is 66 lb. (30 kg.). The DXpeditioners need to supply the coaxial cable and lots of low-band RF energy.

Electrical - A series capacitor is provided for 75 meter operation, a 200- 500 pf variable rated at 2 - 3 KV will typically tune out the reactance, providing a 1.5 to 1 SWR.

On 160 meters a line transformer is included to flatten out the VSWR or transform the impedance to 50 ohms. It is switched in for 160 meters and out for operation on the 80 or 40 meter bands.

Both the capacitor and transformer can be eliminated if a tuner is used. It is recommended that the tuner be located at the transmitter end of the coaxial feedline.

The antenna is designed to use 30 radials, each 66 feet long, arranged like the spokes of a wheel at the base of the antenna.

The power rating is 1.5 KW for CW or SSB operation and 600 watts on RTTY.

Materials - The material used is high strength aluminum (6061-T6) in sizes ranging from 2 to 1 inch outer diameter. Guy lines are 3/32" dacron double braided rope with a rating of 260 pounds break strength. The wind survival rating is 100 mph assuming proper guy anchors are utilized.

Did You Work...

3Y5X, 8Q7AJ, ZSØZ, 7P8EN, AH1A, G4FAM/3DA, J37XT, K5VT/JT, AHØ and 4J1 on the Low Bands?

Then you've worked a
Battle Creek Special!

Wire Version - A wire version *(B.C.S. Lite)*, with traps, radials, and support ropes for attachment to trees, tall buildings or other existing structures is now available. It is similar to the inverted L used with excellent results by J37XT in January 1990 and is much more portable than the 66 lb. version.

This antenna traveled with Vince Thompson to JT/K5VT where it drew rave reviews from the local and Russian enthusiasts. It also went to KHØ with AC8W, N8CC, K8AQM and company for the 1992 ARRL DX CW Contest. They were able to enhance their score with some 160 meter QSO's and multipliers with a top-band opening the second morning of the contest.

This antenna also made a trip to, 4J1, M-V land for the 1992 CQWW Phone contest where it also performed well.

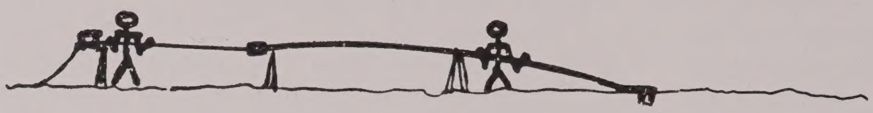
Evolution - Four *Battle Creek Special's* have been built by WØCD so far, with the design improving with each iteration. The Battle Creek Top Banders (W8UVZ, K8GG and WØCD) should be congratulated for helping the low band community work some of the rarer DX countries in recent years on the 40, 80 and 160 meter bands.

Conclusion - Qualified DXpeditioners, going to rare and semi-rare locations are invited to contact WØCD or any of the other "Battle Creek Top-Banders" to discuss plans for the loan of a *Battle Creek Special.*

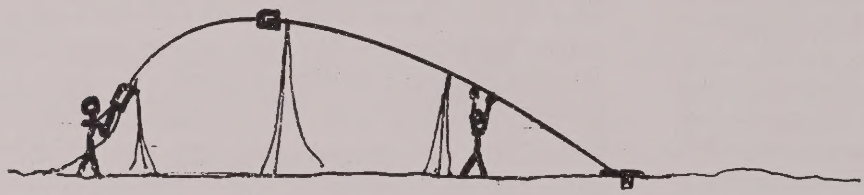
Contact WØCD, Charles Dewey, at 49 Lynwood Drive, Battle Creek, MI 49017, for more details.

Battle Creek

INSTALLATION



STEP 1



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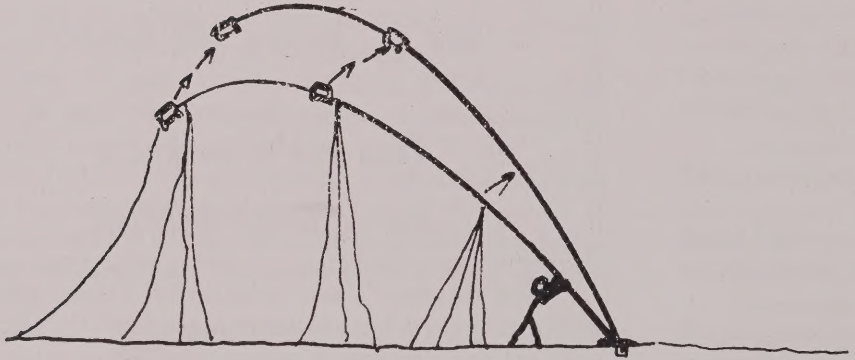

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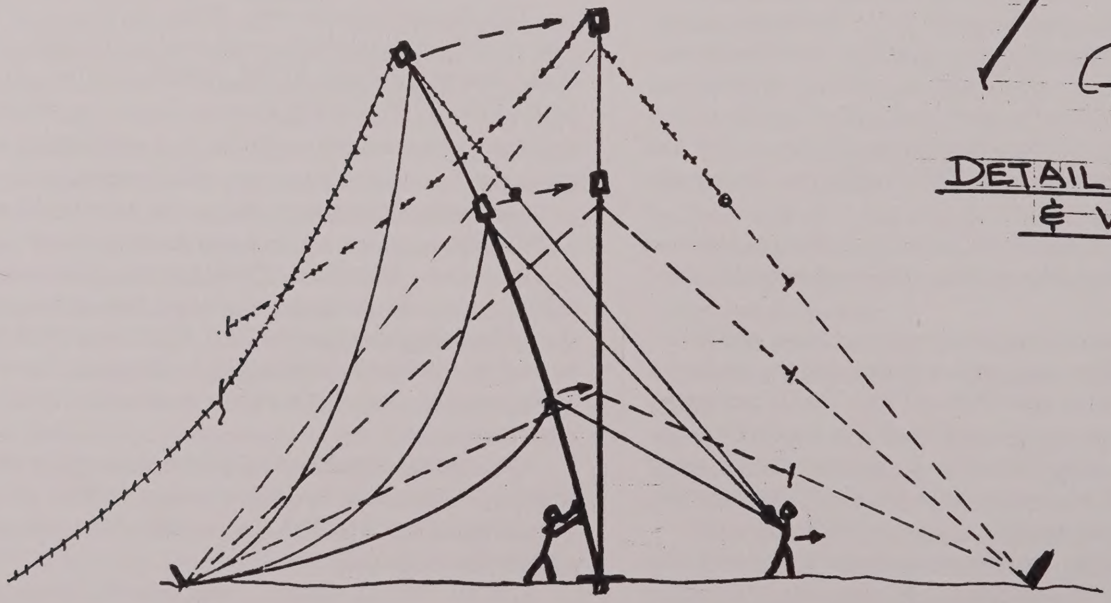
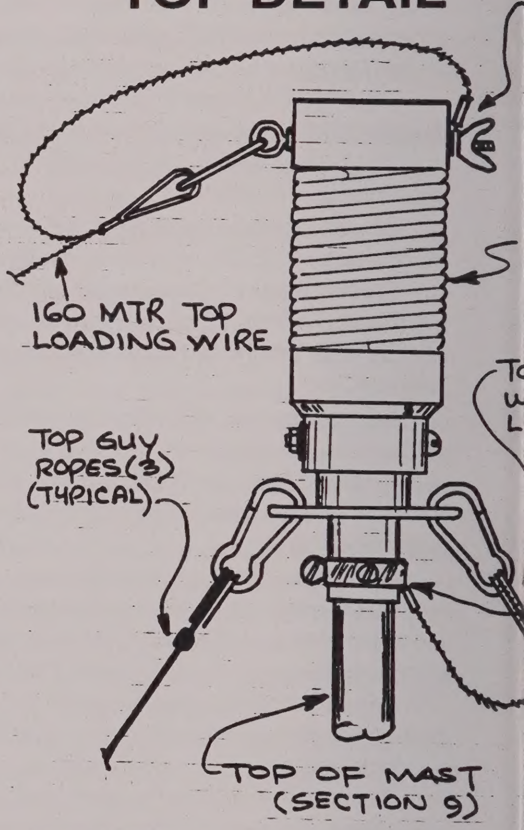


STEP 4

TOP DETAIL



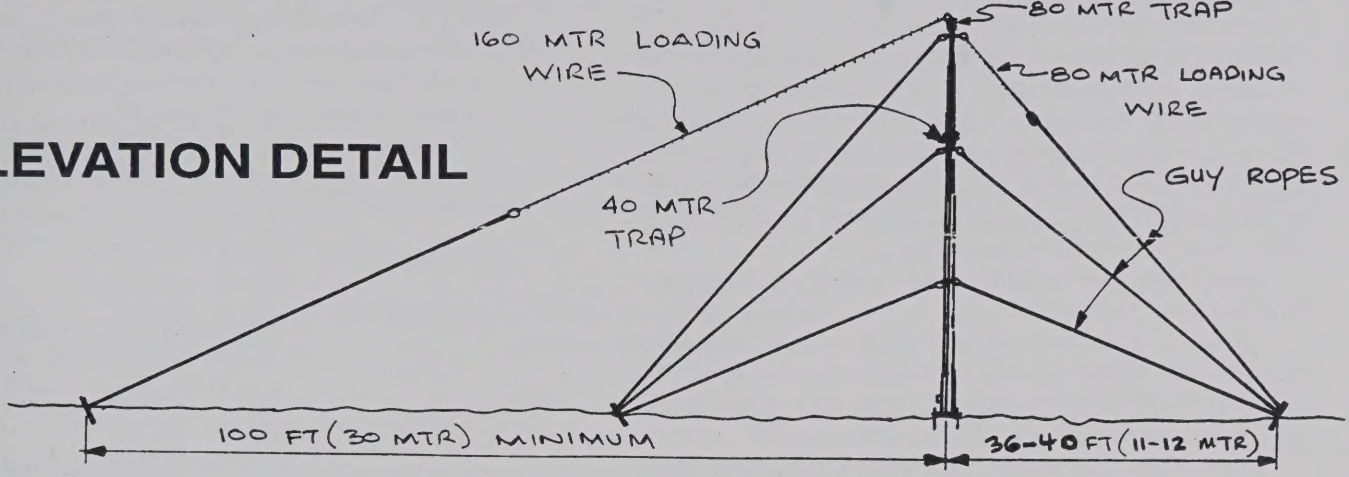
DETAIL ~ TOP ROPE
& WIRES

BATTLE CREE
W8UVZ, K8(

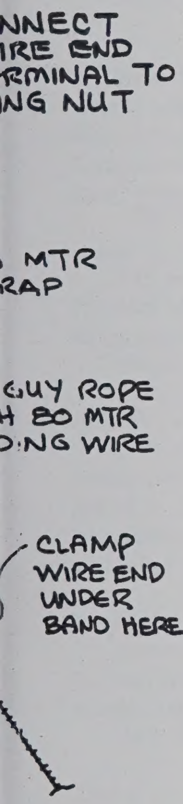
Drawings by Cha

Special Details

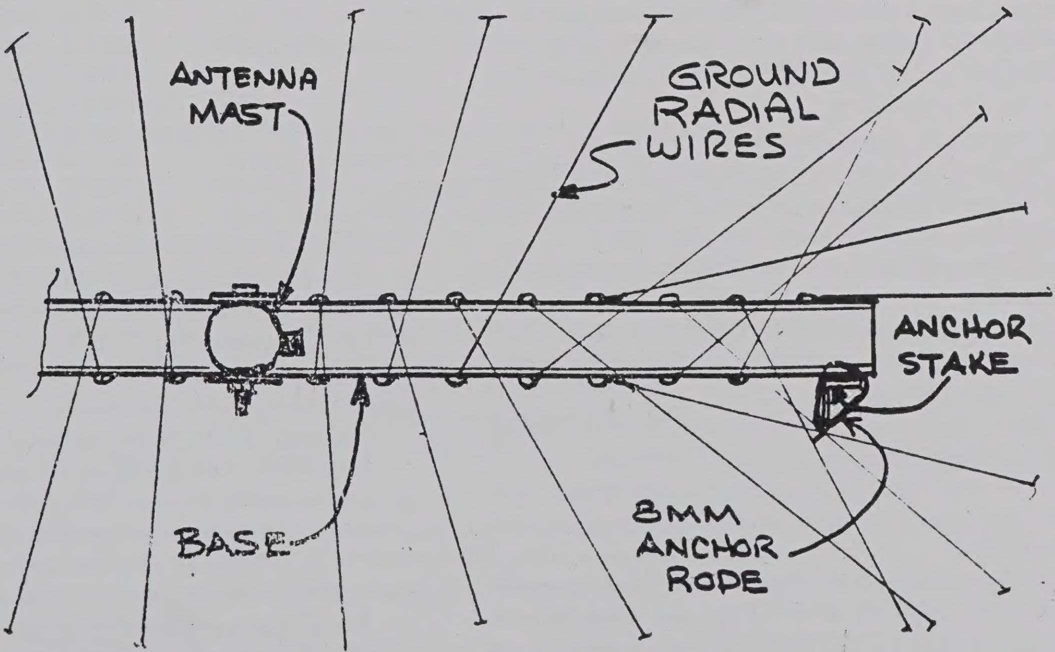
ELEVATION DETAIL



BATTLE CREEK SPECIAL
GENERAL ELEVATION VIEW



BASE DETAIL



PLAN VIEW- BASE & RADIALS

OP BANDERS
and W0CD

Dewey - W0CD

Vernal and Autumnal 80 Meter DX

with David Schoen- N2KK

Editor's Note: David Schoen, N2KK has been one of my favorite 80 meter DXers for over a decade. Back in the 80's Dave was one of the first people to put Zone 34 on 40 and 80 meters at the peak of CQ Magazine's 5-Band WAZ frenzy. The stateside pileups were epic. It was simply one of the most exciting times this hobby has ever had. Dave was kind enough to share some insights with us about 80 meter DXing from California. Look at your DX Edge - these are very interesting paths.

Dave, could you tell our readers a little bit about your QTH in Lebec, California.

Lebec is 72 miles north of Los Angeles. I am on the end of a ridge line with an elevation of 4,795 feet above sea level. The ground drops off around 1500 feet on three sides of the 40 acre property and has a slight rise to the western side.

Are you are near Frazier Park and Ft. Tejon State Park near the Tehachapi Mountains on Interstate 5 towards Bakersfield and Visalia?

Yes that's right. I'm around 100 miles south of Visalia, the location of a famous DX gathering.

What is the current 80 meter antenna system?

I am using a 4-square vertical array that covers a full five acres. The system uses 352, 300 foot radials for low angle and miles of chicken wire.

Do you have an extensive Beverage system for receive?

No, I have no neighbors for three miles in any direction and no power lines at all. I use a 20 KW diesel generator for electricity at the location.

What transceiver are you using?

I am currently using the Yaesu FT-1000D.

How do you approach the 80 meter band each year?

Each year I try to work as many DXCC countries as possible. My best season was July 90 - June 91, where I was able to work 160 countries on the 80 meter band.

That's impressive. What are your all time totals?

I have 326 confirmed all time on 80 meters. I just worked Randy, 9G1XA and 9A1A recently, but haven't received the cards yet. Hopefully I can make 330 by the end of the year.

Unreal! Have you ever sent the cards into Newington to make it official?

No, I haven't, but someday I will fly to Newington and let Bill, K5FUV have a look. I have a few QSL's from deleted countries that simply could not be replaced.

Could you explain to our readers about the out of season long path propagation that you see from California?

Yes, I have seen a fairly consistent long path opening into Europe that appears to be centered around both the vernal and autumnal equinoxes.

For the sake of our readers, you are seeing long path on 80 meters centered around the times of the year when the sun crosses the equator and day and night everywhere are of equal length.

That's right. The vernal equinox occurs around the 21st of March every year. The autumnal equinox occurs around the 22nd of September every year.

Dave, I have been on the 80 meter band a bit and I am not at all familiar with this path. Could you show us a few samples?

- *Vernal Equinox - All Worked Long Path.*

March 18, 1990	0257 Z	OZ8BV
	0302 Z	YU1EXY
	0310 Z	SM5EDX
March 19, 1990	0322 Z	UC1AWC
	0430 Z	4U1ITU
March 25, 1990	0252 Z	UF6VZ
	0327 Z	OK2CBU
March 8, 1993	0400 Z	UB5UT
	0422 Z	DL1RWN
	0423 Z	I5REA
	0425 Z	ON4TH
April 11, 1993	0342 Z	YU1KW
	0354 Z	S59DRJ
April 12, 1993	0355 Z	IT9PKO
	0401 Z	OE6MBG
	0404 Z	SM5GZ
April 15, 1993	0210 Z	ET3DX

- *Autumnal Equinox - All Worked Long Path.*

Sept 16, 1990	0447 Z	SM5SB
	0449 Z	DF2PY
	0451 Z	SM5EDX
	0514 Z	G4AMN
Sept 21, 1990	0429 Z	OE6MBG
	0433 Z	LA7ZO
	0442 Z	G3DAM
	0446 Z	I2HVE
Sept 29, 1991	0208 Z	UL7ACI
	0503 Z	DL0EM
	0506 Z	IK2DVN
	0510 Z	G4PEL
Oct 7, 1991	0414 Z	OK3TDO
	0454 Z	OZ1ING
	0459 Z	SM6MCW
Sept 11, 1993	0403 Z	OM3CBU
	0452 Z	G4FIV
Sept 19, 1993	0509 Z	I3MAU
	0554 Z	GD4PTV

Were all these stations worked long path?

Yes, the path is basically right through New Zealand and sometimes South America. I did work G4FIV at 0521 UTC via the short path on September 11, 1993 but that doesn't happen very often. I once worked OH1XX on this long path and his 80 meter signal could not be heard in Spain.

Are many DXers on the west coast aware of this opening?

Bob, W6RJ, Fred, K6SSS and of course Dale, K6UA are also quite active on this path and have made many similar contacts.

Do you have any other insights concerning this opening?

Yes, it's obviously very low angle type of propagation and ones antennas should be designed accordingly.

Thank you for sharing your observations. We will look forward to your low band spots this season.

I plan to be active this year. I would like other 80 meter DXers around the world to share some of their unique propagation openings with your readers.

LETTERS - LETTERS - LETTERS - LETTERS - LETTERS

Lance:

A great idea! I have been a low band enthusiast since 1972. It is a great challenge. Good luck!

Randy, W9ZR

Randy:

We are honored to have you join the ranks. Your totals of 331, 323, and 233 are awesome. Perhaps this publication can help you work a few of your last 5 zones on 160 meter; otherwise, you are on your own!

Lance:

Your newsletter will give me something to read during the cold New Hampshire nights.

Craig, NX1G

Craig:

Zero district DXers probably do a lot more reading while operating on the low bands than those in the first district. Please tell the 160 meter European DXers that all has been well in Colorado for the last four years.

Lance:

I'm presently constructing a nine element 75 meter wire yagi with a 400 foot boom for Japan. I will let you know how it works.

Floyd, WA2WVL

Floyd:

Q-R-ZED Japan! JA1 only! Listening for stations between 1st and 58th Street in Tokyo! WA2WVL Q-R-ZED! Floyd your 75 meter spots from March and April (UJ8, A45, 9K2, 3X, and ET3) were also world class!

Lance:

I'm not sure about the Low Band Monitor... but with local experts like K1ER and KY0A to furnish info, how can you miss.

John, K1ER

John:

Thanks for the subscription and thanks for your computer expertise in managing the 52,000 AH1A QSL's. I will always cherish the barefoot 160 meter contact. Those AH1A guys could hear!

Lance:

If I can work Alaska on 160 meters from West Virginia, my subscription will be a good investment.

John, W8WEJ

John:

West Virginia is rarer on 160 meters than KL7! I would guess that the CQWW Phone would be your first good shot at KL7 this season. I have sent our flyer to six well known Alaskan DXers. Perhaps a few of them will subscribe. I hope that you are able to catch one.

Lance:

Low Band Enthusiasts are really a breed apart. I'm sure that many of them will welcome a newsletter targeted specifically at their needs.

Don, G3XTT

Don:

Thank you for your support. The Low Band Monitor will make every attempt to keep the enthusiast informed about activities and other developments in this phase of our hobby.

Lance:

You are much improved. Your typos are down to only six per page. Try the Courier font for your Low Band Power Spots. You will thank me someday.

Clark, W8TN

Clark:

We all thank you! We have alignment of the spotting data now and I can flow the text much faster. You must know something about typesetting. I'll bet that you own a computer, work moon bounce on 432 mz. and were educated at an Eastern University.

Lance:

I am looking for some of the old W1BB newsletters. Do you have any suggestions. I understand they were great.

Arnold, WK1H

Arnold:

I have a few of the late W1BB's in my archives and they were great. Suggest that you try one of our free classified ads. There are probably a few of our subscribers that can help you.

Lance:

It looks like your publication is what is needed to keep the low band DXer informed. It was a pleasure to recently work Randy, 9G1XA on 40, 80 and 160 meters a truly great operator!

Dale, K3ND

Dale:

Your comments about Randy are shared by many. Your home made top hat base loaded vertical merits discussion. Anyone who has also worked VU7, Andamans on 75 meters, with a half acre is doing something right!

Lance:

Would you clarify, at some point, what a "Battle Creek Special" is? I would also like some tips on working zone 26 on 80 meters from the east coast.

Mike, AI1N

Mike:

I will write W0CD concerning the "Battle Creek Special". I have wondered about it myself as the only "new ones" I have worked in the last few years have used it. A few years ago at the Dayton Hamvention™, I was able to look at George Collin's, HS4AMI's log book. He worked most of his East coast stations at their local sunset, which is sometimes a very productive path.

Lance:

Glad to see my call in the A35ZZ log. Haven't been active of late, as I just completed a new home, but should be on 40 and 80 meters by late fall.

Keith, KS0Z

Keith:

Your timing is just about right. There has been some interesting propagation this summer, but as you know, the serious action usually starts with the CQWWCW in late November. Good luck with your towers.

Lance:

I'm pleased that someone is doing a low band newsletter. The low bands have become for me a 30 year "magnificent obsession". I have enclosed a copy of my Gray-Line DXing article from November 1992 QST. Looking forward to your new publication.

Tom, N4KG

Tom:

Your Gray-Line article was one of the best articles ever written on the topic. At 329, 309, and 202 you are in the upper strata of low band achievers world wide. I remember you from the W8FAW days as do many of our readers. If you want to share some of your Beverage antenna insights with our readers we are all ears.

Lance:

I can't subscribe now, as I am apartment bound, a sad fate for a DXer. I enjoyed the W0ZV article very much as I worked Bill as a novice when I was KN2MMS. I also have operated KV0Q's station which is a nice set-up. Hope to be on in 1994.

Josh, WX7K

Josh:

I know the scenario. I missed most of 1985 and 1986 when we had a big corporate takeover, transfer, and consolidation. Hope that you can join us in the future.

Lance:

I really liked the charter membership certificate for the Low Band Propagation Research Society. It's ready to go on the wall now. Phoenix DXers caught the 9M0S around 1115 UTC on 80 meter CW. I'm just getting my station set up at the new QTH and look forward to future issues.

Mike, KC7V (ex XX9MF)

LETTERS - LETTERS - LETTERS - LETTERS - LETTERS

Mike:

That 9M0S contact on 80 meters was a jewel. Very few people made the grade worldwide. Sorry that you also had bad propagation on 80 meters when you were in Macao. VS6CT said that Zone 24 was tough, but you don't really understand what he means until you go there.

Lance:

Add me to your list of subscribers. My Marconi antenna taken from Bill Orr's Handbook really played (7X, A22, 4X, P29, SV, C21, V6, AH1) on 75 meters last winter. I added only six radials and got decent performance.

Phil, K8UNV

Phil:

The P29CW contact certainly highlights the antennas performance. I still need P29 myself and my path is at least 1,000 miles closer than yours. These stations typically run 100 watts or less. We will follow up on the Marconi.

Lance:

I write a column for The Canadian Amateur Magazine and have been very active with Australia on 160 meters with the S.E.A.N.C.E. net conducted by VK4YB. I hope to relate some of my 160 meter propagation insights to your readers.

Bob, VE7BS

Bob:

You would certainly be an asset to this publication with your long term perspectives on Pacific 160 meter propagation. Your analysis techniques themselves would be of interest to the faithful for any path on any frequency. If any of our articles can be of use, feel free to use them.

Lance:

Do you know anyone in the Tucson area that would be interested in exchanging low band spots?

Doc, KD7SO

Doc:

Tucson people are typically 2 handicappers with real slow backswings. You might want to try HF packet. Denver also suffers from similar isolation, with no packet links outside of the state. We will notify you if another Tucson enthusiast subscribes.

Lance:

Are back issues available of the previous issues of the Low Band Monitor available to recent subscribers? They might be helpful to those who are just getting started.

Bill, AA4NU

Bill:

We will routinely send all new subscribers a complete set of back issues free during the first few months of publication. After that we will charge $2.00 for each back issue plus postage. You should be up to date by now.

Lance:

I will try to write something for you about low band antennas in the near future.

John, W0UN

John:

Thanks for the subscription. Your insights would be greatly appreciated by our readers.

Lance:

Thanks for the sample. Sign me up for a year.

Fred, K6SSS

Fred:

I used parts of your (and K6UA's) classic Gray Line DX article from CQ Magazine for a report on HF propagation when I was in undergraduate school. The E.E. professor was a non-ham, but was impressed enough to give me an "A". Thanks!

Lance:

I would really like to see sources for available propagation software that helps in predicting 160 meter band openings.

Jim, NW0O

Jim:

I have looked at most of the offerings and can only say that they are "trivial". I am curious about some of the research that has been done in the past by the military, but has been classified. We will pursue the computer based 160 meter prediction software later. For now it's sunrise, sweet spot and sunset.

Lance:

Good to know that someone else is working DX on the 80 meter band in the summer. I have been very active from California and will enjoy the forum your publication will provide.

Dave, N2KK

Dave:

Very pleased to hear from you. I rate your Zone 34 operation from the 1980's as the best low band DXpedition of all time and I'm sure many others agree with me. I plan to review your summer 80 meter activity in a future issue.

Lance:

I spotted Jim, VK9NS on 3.796 at 1031 UTC on August 15. I'm really enjoying the newsletter!

Dennis, WD4KXB

Dennis:

The VK9NS spot on 80 meters is significant as Jim has had his low band antennas down for awhile. He is one of my somewhat embarrassing "need to work" countries on 80 meters and represents a new one to many stations on the East coast. - Thanks.

Lance:

I will be active on the low bands as ZD9SXW from Tristan Da Cunha from September 30 to October 21. I will have a TS-930S and an MLA-2500. I will be using a GAP Voyager DX-IV. Sunrise during the period is 0710 - 0645 UTC, with sunset at 1930 - 1955 UTC. This will be CW only at 1.833 mz., 3.505 mz and 7.003 mz. Call up 1 to 3 mz.

Roger, G3SXW

Roger:

Many of our readers are looking forward to working you. Hope everything goes well. This could turn out to be one of the key low band operations this fall as it will probably be a good daily barometer for 160 meter propagation. We all wish you luck and hope that the bands cooperate with your operating goals.

Lance:

Good idea, one I have considered trying several times in recent years, but my regular job keeps me too busy. Glad to see that someone else is doing it. Good Luck with your new low band publication.

Stan, W8YA

Stan:

Thanks for the kind words. Low band Dxing can be a very lonely pursuit at times. We simply want to provide a forum for sharing common insights among the enthusiasts.

Lance:

I will probably be active from VK9MM when you receive this. Our group is also looking at future operations from VK9X, VK9C, ZL8, T33, 3D2C, T31, and VK0M. We will be using a Yaesu FT-990 and FL-7000 plus a GAP Voyager DX-IV from Mellish Reef on the low bands. As QSL manager for VK9MM, I will summarize totals at a future date.

Bill, VK4CRR

Bill:

Everyone is working the VK9MM operation now. You are over 25,000 QSO's as this is being written. Hope 160 meter propagation picks up for you - I can't find you! Our readers would certainly like to hear about your low band activity. I will also advise everyone that VK9CE is not your son! Good Luck!

LETTERS - LETTERS - LETTERS - LETTERS - LETTERS

Lance:

The Battle Creek Top Banders have two Battle Creek Specials and one Battle Creek Lite antennas to loan to DXpeditions. We are currently sending one to the Peter I, 3Y operation in early 1994. Low band enthusiasts are encouraged to contribute to this worthwhile low band project as each antenna is around $300 and our original donation fund has been depleted.

George, W8UVZ

George:

I am sure that some of our readers would be honored to send your group a small donation. Your antenna has probably given most of the faithful at least one new band country in the last few years. The low band community needs to get more of these antennas on the air. Hope that Dov, 4Z4DX is able to put one to use from TL8 in 1994. Thanks for providing us with the information.

Lance:

Your publication could fill the gap that was left when a few others did a newsletter focused on the low bands. The Rainbow Ridge group (3,000' above Malibu) has big plans for the low bands this season. Hope that you do well with your publication.

Darrell, N6DX

Darrell:

I believe I met you at Dayton a few years ago. The 175 foot 160 meter vertical with three parasitic elements would merit some additional photos. The full sized 3 element 80 meter beam with an 80 foot boom also has our attention. Say hello to Johnny Carson for me.

Lance:

I enjoyed your AH1A QSL poster in your last issue. Hope that the subscriptions continue to come in for you.

Walt, W0CP

Walt:

Thanks! A super operation by everyone's standards. The subscriptions could be better, but we are still getting steady response from the true enthusiast.

Lance:

Put me down for a subscription to your propaganda sheet. We need all the help we can get in Johnson County Kansas.

Bill, AK0A

Bill:

Thanks Bill! As a Kansas City DX Club Associate member I couldn't agree more. I am planning some articles on ESP filters for low band enthusiasts in the zero district for this winter. Stay tuned for a real breakthrough in technology.

Lance:

Your newsletter looks pretty good. I am planning on making a small low band comeback this year, but am doing the shack wiring and antenna work very slowly. Perhaps K5UR would share a few secrets with your readers?

Bill, K5FUV

Bill:

Thanks for the kind words. Hope to hear you on the bands this season. Congratulations on your new DXCC assignment. Who's K5UR?

Lance:

Thanks for the flattering letter. The 80 meter operator at our CQWWCW 1992 CW multi-multi effort was K1MM. I have enclosed our country list for your readers. Feel free to use it as you see fit.

John, K1AR

John:

Your first stations worked list will be featured soon. It will provide our readers with a true perspective of what potential exists on the 80 meter band during the November CQWWCWDX Test. K1MM is to be congratulated for a truly outstanding effort - 100 - 80 meter countries!

Lance:

Here's my countries list from the 1992 CQWWDXCW Test. I use a four element vertical array, with 3 elevated radials under each vertical and 186 ground mounted radials (744 total) under each vertical. The rig is an FT-1000D and an AL-1500 amplifier.

Jeff, K1ZM

Jeff:

Thank you. You were the first single operator station to work over 100 countries on the 80 meter band in the CWWWDXCW Test. A truly noteworthy accomplishment. We will run your list of countries worked along with K1AR's. This will probably drive a lot of people crazy, but it will show everyone what can be done.

Lance:

Put me on your subscription list. I have 240 confirmed on 80 meters and they really come slowly now - hi! Hope that your publication can help.

Joe, K5CTG

Joe:

That's an outstanding performance on 80 meters. You are at the threshold of the upper echelon, which is a nice situation. You don't have to bother with most of the pileups, but there's still enough left to keep your focus.

Lance:

I plan to be active on the low bands this season. I have a dipole on 160 meters and plan to raise it to 50 feet in early 1994. I am also considering KH8 in 1994.

Cliff, 5W1GC, (KE5GC)

Cliff:

You have the opportunity to make some European DXers very happy, as both 5W and KH8 are extremely good low band contacts from Europe. Please stay in touch.

Lance:

I am currently at 258 confirmed on 160 meters and don't see the band reaching it's peak for at least a year. Look for me in the major DX tests.

Ron, GW3YDX

Ron:

You are often the only European we hear out here. The shunt fed, 105' vertical with a 40-2CD on top has served you well. Continued success in the DX tests!

Lance:

David, N2KK and Dale, K6UA advised that you are publishing a low band oriented newsletter. Put me on your list of subscribers.

Shigeru, JH7GNU

Shigeru:

Thank you for your interest. I would be very interested in finding out if the JA Low Band Attackers Group is still active. By the way the 3D2 group from Japan has been audible on 160 meters in Colorado for a number of days.

Low Band Monitor

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LOW BAND MONITOR POWER SPOTS - SEPTEMBER, 1993

TNX: N8HTT - W8TN - KYØA - N2KK - W8UVZ - W6NIZ - KVØQ

160 METERS

1850.0	EA8PP	29-Sep-1993	0440Z
1827.0	9G1XA	28-Sep-1993	0545Z
1824.4	3D2AW	28-Sep-1993	1248Z
1830.1	G3PQA	28-Sep-1993	0016Z
1832.9	EI5HJ	27-Sep-1993	2323Z
1832.9	VK3QI	27-Sep-1993	1241Z
1833.0	DK7SU	27-Sep-1993	0442Z
1835.0	TI4CF	27-Sep-1993	0431Z
1831.0	VP2VA	27-Sep-1993	0421Z
1825.0	3D2OH	26-Sep-1993	1201Z
1827.0	VK9MM	26-Sep-1993	1120Z
1825.0	3D2OH	25-Sep-1993	1251Z
1832.0	GD4BEG	25-Sep-1993	0442Z
1825.0	**VK9MM**	**24-Sep-1993**	**1120Z**
1830.3	HB0/HB9NL	24-Sep-1993	0419Z
1831.2	SV8ZS	24-Sep-1993	0406Z
1832.3	DK7SU	24-Sep-1993	0357Z
1831.0	SV8ZS	24-Sep-1993	0336Z
1825.0	VK4YB	23-Sep-1993	1122Z
1832.0	KL7Y	23-Sep-1993	1112Z
1838.0	FK8CP	23-Sep-1993	1026Z
1832.0	KL7Y	22-Sep-1993	1050Z
1827.0	9G1XA	21-Sep-1993	2326Z
1832.7	VK5BC	20-Sep-1993	1106Z
1838.0	FK8CP	18-Sep-1993	1123Z
1831.0	CM2NE	18-Sep-1993	1034Z
1837.5	UJ8JI	17-Sep-1993	2345Z
1826.8	9G1XA	15-Sep-1993	0006Z
1837.8	FK8CP	11-Sep-1993	1114Z
1831.0	VK5BC	11-Sep-1993	1112Z
1833.0	EA3JE	11-Sep-1993	0043Z
1827.0	9G1XA	9-Sep-1993	2304Z
1833.0	EI5HJ	9-Sep-1993	0047Z
1827.1	9G1XA	9-Sep-1993	0012Z
1833.0	VK3QI	8-Sep-1993	1110Z
1839.5	CY9R	7-Sep-1993	0345Z
1837.0	CY9R	6-Sep-1993	0415Z
1833.3	GD4BEG	5-Sep-1993	0454Z
1827.0	9G1XA	5-Sep-1993	0122Z
1827.0	9G1AA	5-Sep-1993	0112Z
1838.0	FK8CP	4-Sep-1993	1039Z
1834.0	CT1AOZ	4-Sep-1993	0528Z
1839.3	G3PQA	4-Sep-1993	0509Z
1845.0	EA8PP	4-Sep-1993	0453Z
1845.0	EA8PP	4-Sep-1993	0458Z
1831.8	UZ6HW	3-Sep-1993	0217Z

160 METER NOTES

- Remi Touzard, FK8CP sends this note to W and VE 160 meter enthusiasts.

"FK8CP has been very active for many months on 160M devoted almost entirely to W/VE. I now have daily skeds on 1838 kz. and other frequencies with Carribean, Asian and other stations."

Therefore he asks that, "W/VE STATIONS NOT CALL HIM UNLESS HE CLEARLY ENDS HIS CQ WITH W/VE".

He normally listens on 1842 kz. and will honor schedules from W/VE hams that do not conflict with his other 160 meter activities.

He can be contacted at: (S.A.S.E.)
Remi Touzard
B.P. 945
Noumea - NEW CALEDONIA

- There is an informal 160 meter SSB net that meets around 0400Z on 1850 kz. Numerous European and stateside stations. Control operators were AC1B and AA4MM. More information about this later as we first heard the operation on September 29th.

80 METERS

3795.0	7X2BK	28-Sep-1993	0301Z
3503.0	3D2MT	27-Sep-1993	1121Z
3797.9	HL2IQC	27-Sep-1993	0528Z
3505.2	9A2DS	27-Sep-1993	0429Z
3795.8	LZ1KOZ	27-Sep-1993	0356Z
3799.0	UL7OB	26-Sep-1993	1356Z
3796.0	VK9MM	26-Sep-1993	1039Z
3799.9	3D2OH	26-Sep-1993	1038Z
3795.0	VK9MM	26-Sep-1993	0802Z
3509.4	HA0HW	26-Sep-1993	0426Z
3790.0	HA3HV	26-Sep-1993	0423Z
3505.9	OM3TDO	26-Sep-1993	0416Z
3788.8	OH2EW/OH0	25-Sep-1993	2343Z
3759.0	OH0DX	25-Sep-1993	2321Z
3799.0	UI9AWX	25-Sep-1993	1400Z
3795.0	YC1DNF	25-Sep-1993	1349Z
3800.0	VK9MM	25-Sep-1993	1139Z
3799.0	OX3KM	25-Sep-1993	0432Z
3799.0	4O4D	25-Sep-1993	0430Z
3503.0	RW9FW	24-Sep-1993	1356Z
3795.3	V63JC	24-Sep-1993	1132Z
3506.7	VK9MM	24-Sep-1993	0844Z
3505.4	9G1XA	24-Sep-1993	0600Z
3507.1	LZ1DY	24-Sep-1993	0354Z
3792.8	SV1AHZ	24-Sep-1993	0339Z
3798.4	9A2PM	24-Sep-1993	0327Z
3506.3	LY1CQ	24-Sep-1993	0326Z
3792.0	HZ1AB	24-Sep-1993	0230Z
3790.0	OO4AWK	24-Sep-1993	0155Z
3791.0	9V1ZE	23-Sep-1993	1329Z
3504.0	4K1F	23-Sep-1993	1009Z
3505.4	VK9MM	23-Sep-1993	1010Z
3504.6	9G1XA	23-Sep-1993	0126Z
3795.1	9G1XA	22-Sep-1993	2353Z
3799.0	P29VH	22-Sep-1993	1402Z
3799.0	VK9MM	22-Sep-1993	0900Z
3513.0	9A2AJ	21-Sep-1993	2316Z
3506.0	VK9MM	21-Sep-1993	1124Z
3506.6	TL8NG	21-Sep-1993	0438Z
3794.0	CN8JC	21-Sep-1993	0032Z
3799.0	P29NB	20-Sep-1993	1347Z
3792.0	V73XP	20-Sep-1993	1116Z
3799.0	BV2AU	20-Sep-1993	1050Z
3795.0	BVØARL	19-Sep-1993	1030Z
3792.8	GD4PTV	19-Sep-1993	0554Z
3508.0	9J2BO	19-Sep-1993	0440Z
3797.0	ZK1AT	18-Sep-1993	0939Z
3796.0	OM3CBU	18-Sep-1993	0440Z
3789.0	XQ8ABF	18-Sep-1993	0357Z
3510.4	ES0/SM3CVM	18-Sep-1993	0045Z
3505.0	9M2AX	17-Sep-1993	2251Z
3792.0	V63JC	17-Sep-1993	1113Z
3504.0	VP5/JM1GYQ	17-Sep-1993	1009Z
3795.6	LU8EEM	17-Sep-1993	1002Z
3508.6	9J2BO	17-Sep-1993	0404Z
3794.6	Z31PK	17-Sep-1993	0415Z
3504.5	9G1XA	17-Sep-1993	0304Z
3794.0	T9AZO	16-Sep-1993	0335Z
3504.5	9G1XA	16-Sep-1993	0202Z
3799.1	Z31PK	14-Sep-1993	0342Z
3799.0	4Z4DX	14-Sep-1993	0305Z
3799.0	Z31PK	14-Sep-1993	0301Z
3795.0	UN7FL	13-Sep-1993	1350Z
3796.0	P29VH	13-Sep-1993	1055Z
3798.0	VP8CEH	13-Sep-1993	0240Z
3779.5	ZB2JL	12-Sep-1993	2339Z
3800.0	R6L	12-Sep-1993	2338Z
3784.3	OX3ZM	12-Sep-1993	0506Z
3505.0	**9A2DW**	**12-Sep-1993**	**0440Z**
3797.0	S57DX	12-Sep-1993	0434Z
3796.4	OL1A	12-Sep-1993	0428Z
3797.0	C21/KC6DX	11-Sep-1993	1224Z
3506.3	Z21HS	11-Sep-1993	0358Z
3797.4	NH9/AH6ML	9-Sep-1993	1123Z
3800.1	C21/KC6DX	9-Sep-1993	1120Z
3798.0	AH6ML/NH9	8-Sep-1993	1211Z
3798.0	C21/KC6DX	8-Sep-1993	0938Z
3789.0	OY1HJ	7-Sep-1993	2318Z

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7007.1	3D2HG	28-Sep-1993	1113Z
7001.0	T97T	28-Sep-1993	0032Z
7005.5	4N7DW	28-Sep-1993	0024Z
7006.5	9A2AJ	27-Sep-1993	2353Z
7002.2	Z31PK	27-Sep-1993	2350Z
7012.5	LX2KQ	27-Sep-1993	2351Z
7007.0	ZA1J	27-Sep-1993	0437Z
7004.1	3B8CF	27-Sep-1993	0245Z
7010.7	4N1Z	27-Sep-1993	0231Z
7012.0	OA4CWR	27-Sep-1993	0222Z
7003.8	9A3IQ	27-Sep-1993	0123Z
7001.2	VK9MM	26-Sep-1993	1401Z
7007.1	HL93IWD	26-Sep-1993	1241Z
7123.0	VK9MM	26-Sep-1993	1220Z
7185.0	VK9MM	26-Sep-1993	0741Z
7006.1	4X1FQ	26-Sep-1993	0417Z
7007.0	4U1ITU	26-Sep-1993	0357Z
7008.7	S51WA	26-Sep-1993	0352Z
7004.6	T97M	26-Sep-1993	0349Z
7011.0	PZ1DY	26-Sep-1993	0334Z
7097.0	CR3Y	26-Sep-1993	0312Z
7007.3	9G1XA	26-Sep-1993	0114Z
7007.0	8J1RL	25-Sep-1993	2301Z
7062.0	OH0DX	25-Sep-1993	2234Z
7003.3	VQ9QM	25-Sep-1993	2231Z
7000.8	S59AA	25-Sep-1993	2109Z
7004.0	A71CW	25-Sep-1993	2058Z
7003.8	T5/OZ1FJB	25-Sep-1993	2019Z
7005.6	VK9MM	25-Sep-1993	1232Z
7002.9	3D2HG	25-Sep-1993	0950Z
7023.0	9G1XA	25-Sep-1993	0643Z
7001.0	LX2PA	25-Sep-1993	0609Z
7005.6	SV1LV	25-Sep-1993	0426Z
7007.7	KG4DX	25-Sep-1993	0424Z
7005.6	4Z4DX	25-Sep-1993	0423Z
7036.8	LZ1FX	25-Sep-1993	0239Z
7006.2	4Z4DX	25-Sep-1993	0236Z
7008.2	HV3SJ	25-Sep-1993	0127Z
7003.6	4N1Z	25-Sep-1993	0021Z
7002.0	VK9MM	24-Sep-1993	1008Z
7085.0	VK9MM	24-Sep-1993	0740Z
7180.0	ZK1AT	24-Sep-1993	0717Z
7006.8	PZ1DY	24-Sep-1993	0418Z
7000.9	FG5FR	24-Sep-1993	0414Z
7006.0	7Q7XX	24-Sep-1993	0353Z
7002.0	3B8CF	24-Sep-1993	0237Z
7005.0	HZ1AB	24-Sep-1993	0159Z
7004.9	TU2XZ	24-Sep-1993	0129Z
7123.0	VK9MM	23-Sep-1993	1321Z
7007.0	HBO/HB9NL	23-Sep-1993	0511Z
7026.9	EI2HY	23-Sep-1993	0443Z
7023.1	9A2HH	23-Sep-1993	0311Z
7001.2	4Z4DX	23-Sep-1993	0309Z
7006.0	ZA1J	23-Sep-1993	0218Z
7002.2	CX8BR	22-Sep-1993	2356Z
7004.0	YU1QL	22-Sep-1993	2326Z
7022.1	GU0FYR	22-Sep-1993	2209Z
7005.7	LX2KQ	22-Sep-1993	2127Z
7086.0	VK9MM	22-Sep-1993	1146Z
7004.3	T94US	22-Sep-1993	0351Z
7005.8	CE0ZRC	22-Sep-1993	0327Z
7005.1	TU2XD	22-Sep-1993	0309Z
7040.0	9G1XA	21-Sep-1993	2256Z
7004.8	5R8DL	21-Sep-1993	0307Z
7123.0	VK9MM	20-Sep-1993	1128Z
7006.4	ZA1J	20-Sep-1993	0308Z
7010.0	5R8DL	18-Sep-1993	2300Z
7003.0	VS6WV	18-Sep-1993	1343Z
7006.0	T30NA	18-Sep-1993	1337Z
7003.3	HR1LW	18-Sep-1993	1113Z
7001.6	ES1WN	18-Sep-1993	0429Z
7005.8	ZA1J	18-Sep-1993	0102Z
7009.8	S51BO	18-Sep-1993	0055Z
7011.2	US2I	18-Sep-1993	0037Z
7082.6	YN9BJ	17-Sep-1993	2351Z
7005.7	ZA1J	17-Sep-1993	2303Z
7010.9	UO5ON	17-Sep-1993	2247Z
7163.0	**8R1AK**	**8-Sep-1993**	**0815Z**